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249 *Senecio Virginianus, arborescens, Atriplicis folio, Par. Bat. 225.*

250 *Sherardia Teucrui folio flore purpureo, Vaillant Disc. p. 49.*  
*Verbena folio subrotundo, serrato ; flore Cæruleo, Sloan. Hist. Vol. 1. p. 171. Tab. 107. f. i.*

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II. *Some farther Remarks on P. Souciel's Dissertations against Sir Isaac Newton's Chronology, by Edmund Halley, L.L.D. Astron. Reg. In a Letter to Dr. Jurin, Coll. Med. & S.R.Soc.*

SIR,

WHEN I gave you my Paper of Remarks on *P. Souciel's Dissertations against Sir Isaac Newton's Chronology*, I was oblig'd to take what he was pleas'd to give us out of *Hipparchus's Comment on Aratus*, not having then that Author himself by me. Since then, by the favour of a very good Friend, having gotten the *Florence Edition of Hipparchus, Anno 1567*, I find an Argument very much *ad Hominem*, which the R. P. must confess will bring the *Argonautick Expedition* full as low as Sir Isaac Newton makes it.

*P. Souciel* in his fifth Dissertation, Page 119, 120, finds out a Star of the first Magnitude, close adjoyning to that we now call *the first Star of Aries*, as it is in the Catalogue of *Ptolemy*, where it is said to be in the *Horn of Aries*, and not in the *Ear*. This Star the R. P. supposes long since to have disappeared ; but that being of old very considerable, it was from this first Star of *Aries*, the Zodiack began, tho'

tho' for Argument-sake he is contented to let it begin as Sir Isaac does, with the aforesaid Star in the Ear or Horn ; which *Hipparchus*, in the last and 54<sup>th</sup> Page, tells us, in his time follow'd the Equinoctial Colure the 20<sup>th</sup> part of an Hour : And supposing the Star that has disappeared, to have been at that time precisely on the Colure, it must differ but 45 Minutes of Right Ascension therefrom : But how he comes to make the difference of Longitude 40 Minutes no way appears, and is *gratis dictum*.

In Page 49 of the laid *Florence*-Edition, *Hipparchus*, treating of the rising and setting of the Constellations, tells us, that that of *Aries* began to rise with 18  $\frac{1}{2}$  Degrees of *Pisces* in the Ecliptic, and was wholly risen with the 24<sup>th</sup> Degree of *Aries*, whilst the Zodiack past the Meridian from 23  $\frac{1}{2}$  Degrees of *Sagittary* to 14 Degrees of *Capricorn* : And again (Page 52) he says, that the Constellation of *Aries* began to set with the 29<sup>th</sup> Degree of *Pisces*, and was wholly set with the 26<sup>th</sup> Degree of *Aries*, whilst the Zodiack past the Meridian from 29 Degrees of *Gemini* to 29 Degrees of *Cancer*. He tells us also that it was the very same Star that both rose and set first in that Constellation, calling it ὁ ἐπὶ τῶν ἀρνητικῶν ποδῶν, Page 49 : And again, Page 52 'tis named ὁ ἐπὶ τῶν ἀρνητικῶν ποδῶν, or *That in the Fore-feet of the Ram*.

This certainly is the Star P. *Souciet* would place on the Equinoctial Colure, and makes it long since to have disappeared ; without enquiring whether the aforesaid *Data* were not abundantly sufficient to determine its place in the Zodiack at that time ; and without regard to the odd uncouth Posture he must suppose the Constellation of *Aries* to be in, when he makes one or both of the Fore-feet so near to, and above the Horn or Ear.

*Hipparchus* expressly says, that it rose when  $23\frac{1}{2}$  Degrees of *Sagittary* was on the Meridian, and set when 29 Degrees of *Gemini* past it; and taking the middle between those Points, it is plain, that it culminated with about 26 Degrees of *Pisces*, and that it had North Declination; the Excess above 180 Degrees shewing that the Ascensional Difference was about  $2\frac{1}{2}$  Degrees. But to give the Argument its full Scope, the Right Ascension of  $23\frac{1}{2}$  of *Sagittary* (allowing *Hipparchus* his Obliquity  $23^{\circ} 51' 20''$ ) will be found  $262^{\circ} 54'$ . And that of 29 Degrees of *Gemini* will be  $88^{\circ} 54'$ : So that this Star was above the Horizon (in the Latitude of 36 Degrees North; to which *Hipparchus* has adapted his Calculation) 12 Hours 24 Minutes or 186 Degrees; whence the Right Ascension of the Star is justly concluded 355 Degrees 54 Minutes; and its Ascensional Difference precisely 3 Degrees; which in that Latitude makes its Declination 4 Degrees 7 Minutes North. We have therefore gotten both the Right Ascension and Declination of this supposed first Star of *Aries*.

Let us now see what Longitude and Latitude results from the aforesaid Right Ascension with 4 Degrees 7 Minutes North Declination, assuming the Obliquity with *Hipparchus*, to have been  $23^{\circ} 51' 20''$ ; and we shall by a just Computation, find the Star at that time to have been in  $27^{\circ} 53'$  of *Pisces*, with  $5^{\circ} 24'$  North Latitude, which therefore was reckoned the place of the Star at that time by *Hipparchus*. Add  $2^{\circ} 40'$ , for 265 Years between *Hipparchus* and *Ptolemy*, and we shall have its place, in *Ptolemy's* Account, *Aries*  $0^{\circ} 33'$ , with  $5^{\circ} 24'$  North Latitude. But the 22d Star of *Pisces* in *Ptolemy's* Catalogue has the same Longitude and Latitude, with sufficient exact.

actness, *viz.* *Aries*  $0^{\circ} 40'$ , with North Latitude  $5^{\circ} 20'$ , and is *Media trium in Lino Boreo Piscium* ("Bayero.") Hence it cannot be doubted but that this Star which *P. Souciet* takes to have been once a Star of the first Magnitude, was no other than the said *22<sup>th</sup>* of *Pisces*, which in the *British Catalogue*, fitted to the Year 1690, is put down in *Aries*  $22^{\circ} 29' \frac{1}{3}$  with North Latitude  $5^{\circ} 21'$ .

How *Hipparchus* came to reckon this Star to be in the Fore-foot of *Aries*, does not at present appear; but it is not unlikely that these Commentaries of his upon *Aratus* were written some time before he set about making his Catalogue of the fixt Stars; when he might change his Opinion, and replace it in the *Line* of the *Fishes*, to which it seems more properly to belong.

Be that as it will, we will for once, suppose with *P. Souciet*, this Star to have been in the beginning of the Zodiack, or of the Constellation of *Aries*, and that at the time of the first fixing the Colures, that of the Vernal Equinox past  $15$  Degrees in Consequence thereof. Now *anno ineunte* 1690, this Star being in *Aries*  $22^{\circ} 29' \frac{1}{3}$ , if we add thereto  $15$  Degrees, we shall have *Taurus*  $7^{\circ} 29' \frac{1}{3}$  for the Point in the Ecliptic that was then the beginning of the Zodiack. Now  $37 \frac{1}{2}$  Degrees, at  $50$  Seconds per Annum, gives  $2700$  Years; from which deducting 1690, we shall have  $1010$  Years before Christ. But this Star having  $5^{\circ} 21'$  North Latitude, the Colure, when it past over it, intersected the Ecliptick in  $2^{\circ} 20'$  less Longitude, which gives the time  $168$  Years later, or but  $842$  Years before Christ. So that *malgré cette grande découverte*, the new System of Chronology is so far from being refuted, that it seems to be very much

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confirmed thereby, at least in the Opinion of the R. Pere.

I have assumed the Latitude to which *Hipparchus* might have adapted his Calculations, to be 36 Degrees; because I find in Page 14. of the aforesaid Edition that he makes the longest Tropical Day 14 h. 30'; And in Page 29, he tells us, that the Southern Star in the left Foot of *Bootes* (v *Bayero*) having 27° 20' North Declination, was above the Horizon, 14 h. 57'; whence it follows, that the Latitude must be 36° 5'. He also tells us, in the same Page 29, that this Star set when 22° of *Capricorn* culminated, and 6° of *Taurus* ascended; repeating the same thing in Pag. 39, which leaves no room to suspect that those Numbers are not the same that *Hipparchus* had computed. I therefore thought it worth while to enquire in what Latitude 6 Degrees of *Taurus* rises when 22 Degrees of *Capricorn* is on the Meridian; and with the Obliquity of the Ecliptick, as now we have it, the Latitude resulting is 35°  $\frac{1}{2}$  North; but with the Obliquity allowed by *Hipparchus*, it will be found less than 35°.

This I say, only to obviate any Objection that may be made by *P. Souciet* to the aforesaid Argument; tho' if he pleases to examine it, he will find that an Error of a Degree in the assumed Latitude, will by no means invalidate the Proof here given that this *First Star of Aries* could be no other than the middle Star in *Lino Boreo Piscium*, marked n by *Bayer*.